tion as an integral part of increasing the therapeutic changes of sequenced chemoradiotherapy programs, there is much to learn from early rodent radiobiology—whole body with single tibial shielding radiation studies [4–6]. It was shown that an early drop in marrow CFU (uncommitted stem cells) in the shielded marrow was due to an increased population of CFU_c (committed descendants). The underlying marrow reserve (CFU) was diminished. In subsequent work from Barts there was more direct evidence for late CFU damage [7]. Mice received no irradiation, 8 Gy whole body, or 8 Gy plus 5×10^5 syngeneic bone marrow cells. Eight months later, there appeared to be no differences in the marrow CFU in all three groups, but there was more active cell cycle activity in the irradiation only group. Furthermore, when marrow was used to rescue lethally irradiated syngeneic recipient mice, the previously irradiated bone marrow was less able to rescue the recipient mice than the control marrow.

There is no doubt that wide field radiation to the red marrow (either as part of total body irradiation or as part of orthodox treatment for other diseases such as medulloblastoma) has lasting effects on marrow reserve. The clinical data reviewed here demonstrate that chemotherapy has a similar effect (as unmasked by later wide field radiation). Whereas radiotherapy effects are on specific sites of red marrow, with chemotherapy the effect is diffuse. Whether the current interest in growth factors will alter this underlying situation is unclear. It is certain that such treatment can help the clinician out of a little temporary blood count difficulty and allow completion of radiotherapy within a specified prescription time. However, the previously discussed rodent radiobiology experiments might suggest that the bone marrow reserve may be diminished by growth factor stimulated CFU to CFU_c progression. The most important aspect of the clinical observations by Dr. Marks and myself may be with regard to increasing our knowledge of marrow reserve. Future research is clearly needed.

P.N. Plowman, Department of Haematology and Oncology, The Hospital for Sick Children, London WC1 United Kingdom, and Department of Radiotherapy/Clinical Oncology, St Bartholomew's Hospital, London, EC1 United Kingdom

REFERENCES

1. Marks LB, Cuthbertson D, Friedman HS: Haematologic toxicity during craniospinal irradiation: The impact of prior chemotherapy. Med Ped Ciatr Oncol 25:45–51, 1995.
2. Plowman PN: The effects of conventionally fractionated extended portal radiotherapy on the human peripheral blood count. Int J Radiat Oncol Biol Phys 9:829–839, 1983.
3. Levitt WH (ed): "A Textbook of X-ray Therapeutics." London: AC Black, 1932.
4. Gidali J, Lajtha LG: Regulation of haemopoietic stem cell turnover in partially irradiated mice. Cell Tissue Kinet 5:147, 1972.
5. Lajtha LG: Haemopoietic stem cells. Br J Haematol 29:529–535, 1975.
6. Lajtha LG: Stem cell concepts. Differentiation 14:23–24, 1979.
7. Proukakis C, Coggle JE, Lindop PJ: Some late effects of radiation in the bone marrow steam cells of the mouse. Radiol Clin Biol 42:24–29, 1973.

Letter to the Editor: Nephron Sparing Surgery for Unilateral Wilms' Tumor

The recent report from the National Wilms' Tumor Study Group [1] does not recommend a prospective trial to determine the impact of nephron sparing surgery on treatment outcome of children with unilateral nephroblastoma and a normal contralateral kidney. This conclusion is supported by the low incidence of renal failure found in a large number of children and adolescents following treatment for unilateral Wilms' tumor. The main concern is that renal failure may develop during adult life.

Nephron sparing procedures remain, therefore, an option for only a limited number of children with unilateral nephroblastoma. Reasonable criteria for nephron sparing surgery in unilateral nephroblastoma may be drawn from previous experience in the treatment of renal cell carcinoma. In adults with unilateral low stage and small renal cell carcinoma, the mortality and recurrence rate following partial nephrectomy or even simple enucleation are comparable to those following radical nephrectomy [2–4]. This approach seems even more reasonable in children with nephroblastoma, since chemotherapy is known to minimize the risk of relapse in nephrectomized children with residual microscopic disease.

We, therefore, investigated the feasibility of tumor enucleation in children with Stage I nephroblastoma and a normal contralateral kidney. Possible candidates for enucleation surgery were evaluated according to the following criteria: 1) Stage I at diagnosis; 2) well-defined margins on post-contrast CT scan; and 3) at least 50% of functioning preservable kidney. Chemotherapy was given pre- and post-operative in all patients. In our experience, enucleation is a safe and simple surgical technique which is effective for both polar or centrally located

tumor. Preliminary results suggest that this approach seems a reasonable option for Stage I unilateral Wilms' tumor [5,6].

Francesco Cozzi, MD
Amalia Schiavetti, MD
Pediatric Surgery Unit and Pediatric Oncology Unit
University of Rome "La Sapienza"
Policlinico Umberto I
00161, Rome, Italy

REFERENCES

1. Ritchey ML, Green DM, Thomas PRM, Smith GR, Haase G, Shochat S, Moksness J, Breslow NE: Renal failure in Wilms' tumor patients: a report from the National Wilms' Tumor Study Group. Med Ped Oncol 26:75–80, 1996.
2. Morgan WR, Zincke H: Progression and survival after renal-conserving surgery for renal cell carcinoma: experience in 104 patients and extended follow-up. J Urol 144:852–885, 1990.
3. Stephens R, Graham SD Jr: Enucleation of tumor versus partial nephrectomy as conservative treatment of renal cell carcinoma. Cancer 65:2663–2667, 1990.
4. Herr HW: Partial nephrectomy for renal cell carcinoma with normal opposite kidney. Cancer 73:160–162, 1994.
5. Cozzi F, Schiavetti A, Clerico A, Matrunola M, Cozzi DA, Castello MA: Tumor enucleation in unilateral Wilms' Tumor: a pilot study [abstr]. Med Ped Oncol 25:313, 1995.
6. Cozzi I, Schiavetti A, Bonanni M, Matrundla M, Cozzi DA, Castello MA: Enucleative surgery for stage I nephroblastoma with a normal contralateral kidney. J Urol 156: in press, 1996.

Letter to the Editor: Response to Letter by Cozzi and Schiavetti

We (the authors) recognize that a number of centers are employing protocols for the use of nephron sparing surgery in children with unilateral nephroblastoma. The purpose of our review was to establish the known risk of renal failure following treatment of Wilms' tumor. The National Wilms' Tumor Study Group has a long-standing commitment to track the late effects of children treated for this disease. The incidence of renal failure that we reported is the best data that is known, to date, in such a large series of patients. It will be many years before all of these patients reach late adulthood and we will be able to determine the exact risk of late clinical renal insufficiency. However, with follow-up ranging up to 25 years, we have noted a very low risk for patients with unilateral tumors.

The letter by Cozzi and Schiavetti referred to the experience with renal cell carcinoma. There is a difference between the latter patients and those with Wilms' tumor. Patients with renal cell carcinoma that are amenable to partial nephrectomy have small tumors at diagnosis. Most Wilms' tumor patients require preoperative chemotherapy to facilitate partial resection. The experience in bilateral tumors suggests that this can be feasible [1]. The National Wilms' Tumor Study Group believes that this is an acceptable treatment for bilateral tumors, given the known increased incidence of renal failure in this group of patients. However, in order to employ this approach for unilateral tumors, one would then have to weigh the small known risk of renal failure in this group vs. the problems with inaccurate staging following chemotherapy [2,3]. Therefore, we have not considered it necessary to adopt such an approach to date.

Michael L. Ritchey, MD
Daniel M. Green, MD
Patrick R.M. Thomas, MD
Glenda R. Smith, MD
Gerald Haase, MD
Stephen Shochat, MD
Jami Moksness, BS
Norman E. Breslow, PhD
Department of Surgery
The University of Texas
Houston Medical School
Houston, TX 77030

REFERENCES

1. Horwitz, et al: Renal salvage procedures in patients with synchronous bilateral Wilms' tumor: a report from the National Wilms' Tumor Study gorup. *Journal of Pediatric Surgery* (in press).
2. Tournade MF, Com-Nouge C, Voute PA, Lemerle J, de Kraker J, Delemarre JFM, et al: Results of the sixth International Society of Pediatric Oncology Wilms' tumor trial and study: a risk-adapted therapeutic approach in Wilms' tumor. J Clin Oncol 11:1014–1023, 1993.
3. Green DM, Breslow NE, D'Angio GJ: The treatment of children with unilateral Wilms tumor. J Clin Oncol 11:1009–1010, 1993.